

1 **CLAIMS**

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4 1. A web content adaptation method comprising:

5 analyzing one or more functions associated with a webpage; and

6 adapting the webpage for presentation on a device based on said analyzing.

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8 2. The method of claim 1, wherein said analyzing comprises generating

9 one or more function-based object models that represent objects comprising the

10 webpage.

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12 3. The method of claim 2, wherein said generating comprises:

13 identifying one or more basic objects associated with the webpage, basic

14 objects comprising a smallest information body that cannot be further divided; and

15 identifying one or more composite objects associated with the webpage,

16 composite objects comprising objects that contain other objects.

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18 4. The method of claim 1, wherein said adapting comprises doing so in

19 view of one or more networking conditions.

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21 5. The method of claim 1, wherein said adapting comprises doing so in

22 view of one or more user preferences.

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1           **6.**    A web content adaptation method comprising:  
2           analyzing one or more functions associated with a webpage that is  
3           configured for presentation within a first client environment; and  
4           based on said analyzing, adapting the webpage for presentation within a  
5           second client environment that is different from the first client environment.

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7           **7.**    The method of claim 6, wherein said analyzing comprises generating  
8           one or more function-based object models that represent objects comprising the  
9           webpage.

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11           **8.**    The method of claim 7, wherein said generating comprises:  
12           identifying one or more basic objects associated with the webpage, basic  
13           objects comprising a smallest information body that cannot be further divided; and  
14           identifying one or more composite objects associated with the webpage,  
15           composite objects comprising objects that contain other objects.

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17           **9.**    The method of claim 8, wherein said generating further comprises  
18           generating said one or more function-based object models as a function of  
19           properties that are associated with said one or more basic objects and said one or  
20           more composite objects.

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22           **10.**   The method of claim 9, wherein said adapting comprises applying  
23           one or more rules to said one or more function-based object models.  
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1           **11.**   The method of claim 6, wherein said first and second client  
2 environments pertain to different client devices.

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4           **12.**   The method of claim 6, wherein said first and second client  
5 environments pertain to different types of client devices.

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7           **13.**   The method of claim 6, wherein said first and second client  
8 environments pertain to different network conditions.

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10          **14.**   The method of claim 6, wherein said first and second client  
11 environments pertain to different user preferences.

12  
13          **15.**   One or more computer-readable media having computer-readable  
14 instructions thereon which, when executed by one or more processors, cause the  
15 one or more processors to implement the method of claim 6.

1           16.     A web content adaptation method comprising:

2           analyzing one or more functions associated with a webpage that is  
3 configured for presentation on a first device type, said analyzing being performed  
4 by generating one or more function-based object models that represent objects  
5 comprising the webpage,

6                 said objects comprising:

7                     one or more basic objects associated with the webpage, basic  
8 objects comprising a smallest information body that cannot be  
9 further divided, said one or more basic objects being configured to  
10 perform one or more of the following functions: (1) providing  
11 semantic information, (1) navigating to other objects, (3) providing a  
12 visual effect on the webpage, and (4) enabling user interaction; and

13                     one or more composite objects associated with the webpage,  
14 composite objects comprising objects that contain other objects, said  
15 one or more composite objects having a clustering function that is  
16 associated with a webpage author's intention; and

17           based on said analyzing, adapting the webpage for presentation on a second  
18 device type that is different from the first device type.

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20           17.     The method of claim 16, wherein said generating of the one or more  
21 function-based object models comprises generating multiple function-based object  
22 models each of which being generated as a function of multiple different  
23 properties that can be associated with associated objects.  
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1           **18.**     The method of claim 16, wherein said generating of the one or more  
2 function-based object models comprises generating at least one function-based  
3 object model for a basic object, said at least one function-based object model  
4 being generated as a function of one or more of the following properties: (1) a  
5 presentation property that defines a way in which the object is presented, (2) a  
6 semanteme property associated with content of an object, (3) a decoration property  
7 pertaining to an extent to which the basic objects serves to decorate the webpage,  
8 (4) a hyperlink property pertaining to an object to which the basic object points via  
9 a hyperlink, and (5) a interaction property pertaining to an interaction method of  
10 the basic object.

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12           **19.**     The method of claim 16, wherein said generating of the one or more  
13 function-based object models comprises generating at least one function-based  
14 object model for a composite object, said at least one function-based object model  
15 being generated as a function of one or more of the following properties: (1) a  
16 clustering relationship property pertaining to a relationship among root children of  
17 the composite object, and (2) a presentation relationship property pertaining to a  
18 presentation order associated with the root children of the composite object.

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20           **20.**     The method of claim 16, wherein said generating of the one or more  
21 function-based object models comprises generating at least one specific function-  
22 based object model that serves to categorize an object.  
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1           **21.**     The method of claim 20, wherein said generating of said at least one  
2 specific function-based object model comprises, for a basic object, generating said  
3 at least one specific function-based object model based upon properties of the  
4 basic object and properties associated with any father or brother objects.  
5

6           **22.**     The method of claim 20, wherein said generating of said at least one  
7 specific function-based object model comprises, for a composite object, generating  
8 said at least one specific function-based object model based upon properties of the  
9 composite object and any of its root children.  
10

11           **23.**     The method of claim 20, wherein said generating of said at least one  
12 specific function-based object model comprises using a rule-based decision tree to  
13 ascertain a category of an object.  
14

15           **24.**     The method of claim 16, wherein said adapting comprises applying  
16 one or more rules to said function-based object models.  
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18           **25.**     One or more computer-readable media having computer-readable  
19 instructions thereon which, when executed by one or more processors, cause the  
20 one or more processors to implement the method of claim 16.  
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1           **26.**     A web content adaptation method comprising:

2           analyzing one or more functions associated with a webpage by generating  
3 one or more function-based object models that represent objects comprising the  
4 webpage,

5           said objects comprising:

6                 one or more basic objects associated with the webpage, basic  
7 objects comprising a smallest information body that cannot be  
8 further divided, said one or more basic objects being configured to  
9 perform one or more of the following functions: (1) providing  
10 semantic information, (1) navigating to other objects, (3) providing a  
11 visual effect on the webpage, and (4) enabling user interaction; and

12                 one or more composite objects associated with the webpage,  
13 composite objects comprising objects that contain other objects, said  
14 one or more composite objects having a clustering function that is  
15 associated with a webpage author's intention; and

16           based on said analyzing, adapting the webpage for presentation on a device.  
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18           **27.**     The method of claim 26, wherein said adapting comprises doing so  
19 in view of one or more networking conditions.  
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21           **28.**     The method of claim 26, wherein said adapting comprises doing so  
22 in view of one or more user preferences.  
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1           **29.**   One or more computer-readable media having computer-readable  
2 instructions thereon which, when executed by one or more processors, cause the  
3 one or more processors to:

4           analyze one or more functions associated with a webpage that is configured  
5 for presentation on a first device type by generating one or more function-based  
6 object models that represent objects comprising the webpage,

7           said objects comprising:

8                   one or more basic objects associated with the webpage, basic  
9 objects comprising a smallest information body that cannot be  
10 further divided, said one or more basic objects being configured to  
11 perform one or more of the following functions: (1) providing  
12 semantic information, (1) navigating to other objects, (3) providing a  
13 visual effect on the webpage, and (4) enabling user interaction; and

14                   one or more composite objects associated with the webpage,  
15 composite objects comprising objects that contain other objects, said  
16 one or more composite objects having a clustering function that is  
17 associated with a webpage author's intention;

18           said generating of the one or more function-based object models  
19 comprising generating at least one function-based object model for a basic  
20 object, said at least one function-based object model being generated as a  
21 function of one or more of the following properties: (1) a presentation  
22 property that defines a way in which the object is presented, (2) a  
23 semanteme property associated with content of an object, (3) a decoration  
24 property pertaining to an extent to which the basic objects serves to  
25 decorate the webpage, (4) a hyperlink property pertaining to an object to

1 which the basic object points via a hyperlink, and (5) a interaction property  
2 pertaining to an interaction method of the basic object;

3 said generating further comprising generating at least one function-  
4 based object model for a composite object, said at least one function-based  
5 object model for the composite object being generated as a function of one  
6 or more of the following properties: (1) a clustering relationship property  
7 pertaining to a relationship among root children of the composite object,  
8 and (2) a presentation relationship property pertaining to a presentation  
9 order associated with the root children of the composite object;

10 said generating further comprising generating at least one specific  
11 function-based object model that serves to categorize an object by:

12 for a basic object, generating said at least one specific  
13 function-based object model based upon properties of the basic object and  
14 properties associated with any father or brother objects; and

15 for a composite object, generating said at least one specific  
16 function-based object model based upon properties of the composite object  
17 and any of its root children; and

18 based upon an analysis of said one or more functions, adapt the webpage  
19 for presentation on a second device type that is different from the first device type.

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21 **30.** The one or more computer-readable media of claim 29, wherein said  
22 instructions cause the one or more processors to adapt the webpage for  
23 presentation on a WAP-enabled device.  
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1           **31.**     A web content adaptation method comprising:  
2           receiving multiple web pages that are configured for display on a first  
3 device type;  
4           processing the multiple web pages to provide multiple different objects  
5 associated with the webpages, individual objects having one or more properties  
6 relating to functions of the individual object;  
7           applying one or more rules to the objects sufficient to provide multiple  
8 different webpages that are configured for display on a second device type that is  
9 different from the first device type.

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11           **32.**     The method of claim 31, wherein the individual objects can have a  
12 presentation property that defines a way in which the object is presented.

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14           **33.**     The method of claim 31, wherein the individual objects can have a  
15 semanteme property associated with the content of an object.

16  
17           **34.**     The method of claim 31, wherein the individual objects can have a  
18 decoration property pertaining to the extent to which an object serves to decorate a  
19 webpage.

20  
21           **35.**     The method of claim 31, wherein the individual objects can have a  
22 hyperlink property pertaining to an object to which another object points via a  
23 hyperlink.

1           **36.**     The method of claim 31, wherein the individual objects can have a  
2 interaction property pertaining to an interaction method of an object.

3  
4           **37.**     The method of claim 31, wherein the individual objects can have a  
5 clustering relationship property pertaining to a relationship among any root  
6 children of an object.

7  
8           **38.**     The method of claim 31, wherein the individual objects can have a  
9 presentation relationship property pertaining to a presentation order associated  
10 with any root children of an object.

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12           **39.**     The method of claim 31, wherein said processing comprises  
13 defining a representation of an object that includes any children of said object.

14  
15           **40.**     The method of claim 31, wherein said processing comprises  
16 assigning a category to one or more objects.

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18           **41.**     The method of claim 40, wherein said assigning comprises using a  
19 rule-based decision tree to ascertain a category for said one or more objects.  
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1           **42.**   The method of claim 40, wherein said assigning comprises  
2 assigning a category from a set of object categories comprising: (1) an information  
3 object that presents content information, (2) a navigation object that provides a  
4 navigation function, (3) an interaction object that provides for user interaction, (4)  
5 a decoration object that serves a decoration function, (5) a special function object  
6 that performs a defined function, and (6) a page object that is associated with  
7 presentation of related information.

8  
9           **43.**   A web content adaptation method that adapts web content from one  
10 format to another, and which uses multiple function-based object models to do so,  
11 where the function-based object models comprise models that pertain to (1) basic  
12 objects that comprise a smallest information body that cannot be further divided,  
13 and (2) composite objects that comprise objects that can contain other objects.

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15           **44.**   The web content adaptation method of claim 43, wherein the  
16 function-based object models are generated as a function of one or more properties  
17 associated with the objects.

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19           **45.**   A system for adapting web content from one format to another  
20 comprising one or more function-based object models, individual function-based  
21 object models representing objects that are present in a webpage in terms of one or  
22 more of an object's functional properties.

1           **46.**     The system of claim 45, wherein one of the properties comprises a  
2 presentation property that defines a way in which the object is presented.

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4           **47.**     The system of claim 45, wherein one of the properties comprises a  
5 semanteme property associated with the content of an object.

6  
7           **48.**     The system of claim 45, wherein one of the properties comprises a  
8 decoration property pertaining to the extent to which an object serves to decorate a  
9 webpage.

10  
11           **49.**     The system of claim 45, wherein one of the properties comprises a  
12 hyperlink property pertaining to an object to which another object points via a  
13 hyperlink.

14  
15           **50.**     The system of claim 45, wherein one of the properties comprises a  
16 interaction property pertaining to an interaction method of an object.

17  
18           **51.**     The system of claim 45, wherein one of the properties comprises a  
19 clustering relationship property pertaining to a relationship among any root  
20 children of an object.

21  
22           **52.**     The system of claim 45, wherein one of the properties comprises a  
23 presentation relationship property pertaining to a presentation order associated  
24 with any root children of an object.

1       **53.**     Software code embodied on a computer-readable medium that  
2 implements the system of claim 45.

3  
4       **54.**     A computer architecture for use in adapting web content for display  
5 on a computing device, the architecture comprising:

6         an analysis module for receiving at least one webpage and processing the  
7 one webpage to produce one or more function-based object models that describe  
8 functional properties of objects that are contained in the one webpage;

9         one or more rules modules that contain rules that are to be used to adapt  
10 content contained in the webpage; and

11         a content adaptation module configured to process the one or more  
12 function-based object models in accordance with one or more rules contained in  
13 the one or more rules modules to produce a new web page that has been adapted  
14 from the one web page.

15  
16       **55.**     The computer architecture of claim 54, wherein the content  
17 adaptation module is configured to produce a new web page for display on a  
18 WAP-enabled device.

19  
20       **56.**     The computer architecture of claim 54, wherein said analysis  
21 module is configured to produce function-based object models that pertain to both  
22 basic objects and composite objects,

23         basic objects comprising a smallest information body that cannot be further  
24 divided; and

25         composite objects comprising objects that contain other objects.

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2       **57.**   The computer architecture of claim 56, wherein said analysis  
3 module is configured to produce, for basic objects, function-based object models  
4 that comprise values associated with the following properties: (1) a presentation  
5 property that defines a way in which the object is presented, (2) a semanteme  
6 property associated with content of an object, (3) a decoration property pertaining  
7 to an extent to which the basic objects serves to decorate the webpage, (4) a  
8 hyperlink property pertaining to an object to which the basic object points via a  
9 hyperlink, and (5) a interaction property pertaining to an interaction method of the  
10 basic object.

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12       **58.**   The computer architecture of claim 56, wherein said analysis  
13 module is configured to produce, for composite objects, function-based object  
14 models that comprise values associated with the following properties: (1) a  
15 clustering relationship property pertaining to a relationship among root children of  
16 the composite object, and (2) a presentation relationship property pertaining to a  
17 presentation order associated with the root children of the composite object.  
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